

2079

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**STOPPING  
WATER POLLUTION  
AT ITS SOURCE**



**MISA**

Municipal/Industrial Strategy for Abatement

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ACUTE LETHALITY DATA FOR ONTARIO'S  
METAL CASTING SECTOR EFFLUENTS  
COVERING THE PERIOD FROM  
MAY 1990 TO MAY 1991

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Ontario

Environment  
Environnement

5/8/92

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ACUTE LETHALITY DATA FOR ONTARIO'S  
METAL CASTING SECTOR EFFLUENTS  
COVERING THE PERIOD FROM  
MAY 1990 TO MAY 1991

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Water Resources Branch  
Ontario Ministry of the Environment

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## SUMMARY

Under the MISA program, the Metal Casting Sector was required to conduct laboratory toxicity tests to monitor its wastewater discharges for acute lethality to rainbow trout and to *Daphnia magna*. This requirement was based on the Ontario Environmental Protection Act, which allows the Ministry to write regulations requesting persons responsible for sources of contaminants to monitor, record and report to the Ministry. The requirements for toxicity testing are in the General Effluent Monitoring Regulation (Ontario Regulation 695/88 as amended to Ontario Regulation 533/89) and in the Effluent Monitoring Regulation For The Metal Casting Sector (Ontario Regulation 648/89). Some additional information is in, "The Development Document For The Effluent Monitoring Regulation For The Metal Casting Sector (Env. Ont. 1989). The monitoring data will be used, in part, to develop effluent limits for acute toxicity. This report is a compilation of the toxicity data for samples collected for the MISA monitoring year from May 1990 to May 1991, and for audit samples tested at the Ministry's laboratory in Rexdale.

The regulatory toxicity tests were conducted by standard procedures (Protocol To Determine The Acute Lethality Of Liquid Effluents To Fish, Env. Ont. July 1983 and *Daphnia magna* Acute Lethality Toxicity Test Protocol, Env. Ont. April 1988). In these tests, the organisms are exposed to undiluted effluent and several effluent dilutions for a fixed period. The trout toxicity test is a 96 hour exposure, and a *Daphnia* toxicity test is a 48 hour exposure. The number of organisms that died is the toxic effect that is recorded. The quantitative measure of toxicity is the median lethal concentration (LC50) which is the concentration of effluent estimated to cause mortality to 50% of the test organisms.

The frequency of sampling varied within the sector. Haley Industries Inc. was required to test their process effluent for toxicity monthly, Ford Motor Company of Canada Ltd. and General Motors of Canada Ltd. were required to test their combined effluents monthly, Canada Pipe Company Ltd. were required to test their combined effluent quarterly. Franklin Electric of Canada Ltd. and Kubota Metal Corp., Fahramet Div. were required to test their cooling water discharge quarterly, the rest were required to test semi-annually. All of these test results were submitted as required except Chrysler Canada Inc. and Franklin Electric of Canada Ltd. who both used the toxicity testing contract lab whose results were rejected. There was a sample from Haley Industries, Ltd. for July 19, 1990 submitted for *Daphnia* testing but the results were invalid due to control mortalities. This data was not added to the database.

The monitoring occurred at 11 sampling locations at 10 sites. For 3 sites, samples were consistently lethal to one or both of the test animals. For 2 sites, samples were frequently, but not always lethal to one or both animals. For 5 sites, samples were either non-lethal to both animals or had LC50 values of > 100 % effluent for all samples. For the period of

February, 1990 to October, 1991, the Ministry reviewed the results for 67 trout and 68 *Daphnia* tests. For trout: 22 samples (33%) were nonlethal, 18 samples (27%) had LC50s > 100% effluent and 27 samples (40%) were lethal (LC50 < 100% effluent). For *Daphnia*: 24 samples (35%) were nonlethal, 16 samples (24%) had LC50s > 100% effluent and 28 samples (41%) were lethal (LC50 < 100% effluent).

The Ministry of the Environment's Aquatic Toxicity Unit performed 21 audit tests over the monitoring period, and found that the results of audits were generally consistent with the results submitted by industry. The differences that were observed between the results can be explained primarily by variability in effluent quality; the audits were not tests of split samples.

An inspection was conducted on the testing laboratory for Chrysler Canada Inc., Etobicoke and for Franklin Electric of Canada Ltd., Strathroy. This inspection was conducted in response to several problems encountered with the toxicity data received by the Ministry on behalf of these companies. The inspection revealed several problems at the testing laboratory, therefore, the data submitted for their clients have been removed from the database.

A preliminary interpretation of the toxicity results, concerning the possible causes of acute lethality, is given below. The Toxicity Test Reports for the samples, reports summarizing the analytical chemistry data for each effluent, as well as plots from the electronic database were used for this purpose.

The samples from Ford Motor Company of Canada Ltd., Windsor; General Motors of Canada Ltd., St Catherines were occasionally toxic to both animals. The reason for this is unclear. In order to resolve the source of the toxicity for these sites, it would take further detailed investigation on potential causes.

Canada Pipe was required by regulation to monitor quarterly but, once it was found how toxic the discharge was, they volunteered to test monthly. All samples from the Cupola Scrubber Sump Pit were very toxic to both trout and *Daphnia*. The discharge contained toxic levels of many metals and other toxicants. The company has been working towards a zero discharge condition and presently has no effluent.

The East Process Sewer of Haley Industries Ltd. was normally lethal to one or both test animals. Non-lethal samples were more common for *Daphnia* than trout. Levels of copper in excess of 2 mg/L, levels of cyanide as high as 2 mg/L, levels of chromium in excess of 0.9 mg/L, levels of total ammonia in excess of 50 mg/L, and suspended solids over 400 mg/L are all high enough to explain this toxicity.

The remaining sites in this sector were relatively non-toxic with respect to acute lethality.

The toxicity tests will detect harmful concentrations and mixtures of most chemical



constituents of effluents. But compliance with end-of-pipe limits for acute toxicity would not necessarily control the potential effects of environmental contamination that can be caused by the loading of bioaccumulative substances. These substances are generally nonpolar organic chemicals of high molecular weight and low water solubility or metals such as mercury which accumulate in its organic forms or cadmium which can cause permanent damage at sublethal levels accumulating over the life span of aquatic animals.

The body of this report, presents the summaries of the acute lethality data, grouped by company. These summary pages are part of the complete database, that includes the Toxicity Test Report submitted by industry for each test sample. The details from the database are available from the Water Resources Branch, upon request. The comment fields on individual Toxicity Test Reports were entered by the industry's laboratory performing the tests, and should not be expected to be consistent across samples and do not necessarily represent the views of the Ministry.



COMPANY: Canada Alloy Castings Ltd., Kitchener  
(42580001)  
SECTOR: Metal Casting  
REGION: West Central

#### SUMMARY

Three samples were collected from the Storm Sewer and tested for acute toxicity to rainbow trout using the 96 hr LC50 test. Three were non-lethal.

---

#### Storm Sewer

03900906 sampled: 10/16/90 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments: Non Lethal

03910129 sampled: 02/19/91 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments: Effluent Hardness = 380 mg/L; MOE Audit

03910233 sampled: 04/11/91 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments: Non-lethal

COMPANY: Canada Alloy Castings Ltd., Kitchener  
(42580001)  
SECTOR: Metal Casting  
REGION: West Central

#### SUMMARY

Three samples were collected from the Storm Sewer and tested for acute toxicity to *Daphnia magna* using the 48 hr LC50 test. One sample had an LC50 of >100% effluent. LC50 values for the other two were 70.7 and 35.4% effluent.

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#### Storm Sewer

03900906 sampled: 10/16/90 LC50: 70.7 %  
95% fid. limits: 50.0 - 100.0 %  
comments:

03910129 sampled: 02/19/91 LC50: 35.4 %  
95% fid. limits: 25.0 - 50.0 %  
comments: Effluent Hardness = 380 mg/L; MOE Audit

03910233 sampled: 04/11/91 LC50: >100 %  
95% fid. limits: 0.0 - 0.0 %  
comments: LC50 >100; *Daphnia* floating on surface

COMPANY: Canada Pipe Company Ltd., Hamilton  
(4940508)  
SECTOR: Metal Casting  
REGION: West Central

#### SUMMARY

Nine samples were collected from the Cupola Scrubber Sump Pit and tested for acute toxicity to rainbow trout using the 96 hr LC50 test. LC50 values were 0.3, 7.6, 4.3, 0.3, 0.8, 0.1, 0.7, 80.6, 46.7% effluent.

---

#### Cupola Scrubber Sump Pit

03900469	sampled: 06/12/90	LC50:	0.3 %
	95% fid. limits: 0.1 -	0.4 % slope:	3.4
	comments:		
03900801	sampled: 09/12/90	LC50:	7.6 %
	95% fid. limits: 5.7 -	9.9 % slope:	7.2
	comments:		
03900893	sampled: 10/10/90	LC50:	4.3 %
	95% fid. limits: 2.1 -	8.6 %	
	comments:		
03901055	sampled: 12/05/90	LC50:	0.3 %
	95% fid. limits: 0.1 -	1.0 %	
	comments:		
03901074	sampled: 12/12/90	LC50:	0.8 %
	95% fid. limits: 0.5 -	1.1 % slope:	4.4
	comments:		
03910027	sampled: 01/16/91	LC50:	0.1 %
	95% fid. limits: 0.1 -	0.1 % slope:	6.2
	comments:		
03910095	sampled: 02/06/91	LC50:	0.7 %
	95% fid. limits: 0.3 -	1.3 % slope:	2.0
	comments:		
03910178	sampled: 03/20/91	LC50:	80.6 %
	95% fid. limits: 65.0 - 100.0 %		
	comments:		
03910246	sampled: 04/17/91	LC50:	46.7 %
	95% fid. limits: 35.6 -	61.1 % slope:	6.0
	comments:		

COMPANY: Canada Pipe Company Ltd., Hamilton  
(4940508)  
SECTOR: Metal Casting  
REGION: West Central

#### SUMMARY

Nine samples were collected from the Cupola Scrubber Sump Pit and tested for acute toxicity to *Daphnia magna* using the 48 hr LC50 test. LC50 values were 2.9, 12.2, 70.7, 0.7, 0.2, 0.08, 0.2, 18.0, 18.0% effluent.

---

#### Cupola Scrubber Sump Pit

03900469	sampled: 06/12/90	LC50:	2.9 %	
	95% fid. limits: 0.2 -	4.5 % slope:	2.6	
	comments:			
03900801	sampled: 09/12/90	LC50:	12.2 %	
	95% fid. limits: 8.5 -	17.5 % slope:	3.0	
	comments:			
03900893	sampled: 10/10/90	LC50:	70.7 %	
	95% fid. limits: 50.0 -	100.0 %		
	comments:			
03901055	sampled: 12/05/90	LC50:		0.07700 %
	95% fid. limits: 0.0 -	0.1 % slope:	1.9	
	comments:			
03901074	sampled: 12/12/90	LC50:	0.7 %	
	95% fid. limits: 0.5 -	1.0 %		
	comments:			
03910027	sampled: 01/16/91	LC50:	0.2 %	
	95% fid. limits: 0.1 -	0.2 % slope:	7.0	
	comments:			
03910095	sampled: 02/06/91	LC50:	0.2 %	
	95% fid. limits: 0.1 -	0.3 % slope:	3.1	
	comments:			
03910178	sampled: 03/20/91	LC50:	18.0 %	
	95% fid. limits: 13.0 -	25.0 %		
	comments:			
03910246	sampled: 04/17/91	LC50:	18.0 %	
	95% fid. limits: 13.0 -	25.0 %		
	comments:			

COMPANY: Chrysler Canada Inc., Etobicoke  
(123910002)  
SECTOR: Metal Casting  
REGION: Central

#### SUMMARY

One sample was collected from Storm Sewer and tested for acute toxicity to rainbow trout using the 96 hr LC50 test. The LC50 value ranged from 65.0 to 100.0% effluent.

---

#### Storm Sewer

03910054 sampled: 01/22/91 LC50: 65.0 - 100.0 %  
95% fid. limits: 0.0 - 0.0 %  
comments: Effluent Hardness = 160 mg/L; MOE Audit

COMPANY: Chrysler Canada Inc., Etobicoke  
(123910002)  
SECTOR: Metal Casting  
REGION: Central

#### SUMMARY

One sample was collected from Storm Sewer and tested for acute toxicity to *Daphnia magna* using the 48 hr LC50 test. One had an LC50 value of 15.7% effluent.

---

#### Storm Sewer

03910054 sampled: 01/22/91 LC50: 15.7 %  
95% fid. limits: 12.1 - 20.4 % slope: 5.4  
comments: Effluent Hardness = 160 mg/L; MOE Audit



COMPANY: Ford Motor Company of Canada Ltd., Windsor  
(20107)  
SECTOR: Metal Casting  
REGION: Southwest

#### SUMMARY

Thirteen samples were collected from the Foundry Combined Effluent and tested for acute toxicity to rainbow trout using the 96 hr LC50 test. Seven had LC50s of >100 % effluent. LC50 values for the others ranged from 27.5 to 100.0% effluent.

---

#### Foundry Combined Effluent

03900378	sampled: 05/09/90	LC50:	40.4 %
	95% fid. limits: 32.3 -	50.5 % slope:	6.2
	comments: Lethal		
03900483	sampled: 06/13/90	LC50:	27.5 %
	95% fid. limits: 18.9 -	40.1 % slope:	2.9
	comments: Lethal		
03900610	sampled: 07/18/90	LC50:	65.0 - 100.0 %
	95% fid. limits: 0.0 -	0.0 %	
	comments: LC50 Ranged		
03900666	sampled: 08/08/90	LC50:	>100 %
	95% fid. limits: 0.0 -	0.0 %	
	comments: LC50 >100		
03900776	sampled: 09/05/90	LC50:	>100 %
	95% fid. limits: 0.0 -	0.0 %	
	comments: LC50 >100		
03900882	sampled: 10/03/90	LC50:	>100 %
	95% fid. limits: 0.0 -	0.0 %	
	comments: LC50 >100		
03900971	sampled: 11/07/90	LC50:	65.0 - 100.0 %
	95% fid. limits: 0.0 -	0.0 %	
	comments: LC50 Range 65.00 - 100.00		
03901057	sampled: 12/05/90	LC50:	40.0 - 65.0 %
	95% fid. limits: 0.0 -	0.0 %	
	comments: LC50 Range		
03910000	sampled: 01/02/91	LC50:	75.0 %
	95% fid. limits: 61.4 -	91.4 % slope:	8.1
	comments:		

Ford Motor Company of Canada Ltd. (continued)

01910004 sampled: 01/09/91 LC50: >100 %  
95% fid. limits: 0.0 - 0.0 %  
comments: MISA Audit

03910097 sampled: 02/06/91 LC50: >100 %  
95% fid. limits: 0.0 - 0.0 %  
comments: LC50 >100

03910153 sampled: 03/06/91 LC50: >100 %  
95% fid. limits: 0.0 - 0.0 %  
comments: LC50 >100

03910206 sampled: 04/03/91 LC50: >100 %  
95% fid. limits: 0.0 - 0.0 %  
comments: LC50 >100

Intake Water

Foundry Process Effluent

Rain Gauge

Foundry Combined Overflow

COMPANY: Ford Motor Company of Canada Ltd., Windsor  
(20107)  
SECTOR: Metal Casting  
REGION: Southwest

#### SUMMARY

Thirteen samples were collected from the Foundry Combined Effluent and tested for acute toxicity to *Daphnia magna* using the 48 hr LC50 test. Five had LC50s of >100 % effluent. LC50 values ranged from 19.1% to 100.0% effluent.

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#### Foundry Combined Effluent

03900378	sampled: 05/09/90	LC50:	19.1 %
	95% fid. limits: 13.9 -	25.7 % slope:	3.8
	comments:		
03900483	sampled: 06/13/90	LC50:	31.9 %
	95% fid. limits: 24.5 -	41.3 % slope:	6.0
	comments:		
03900610	sampled: 07/18/90	LC50:	>100 %
	95% fid. limits: 0.0 -	0.0 %	
	comments: LC50 >100		
03900666	sampled: 08/08/90	LC50:	80.4 %
	95% fid. limits: 59.1 -	109.2 % slope:	3.8
	comments:		
03900776	sampled: 09/05/90	LC50:	70.6 %
	95% fid. limits: 53.9 -	92.4 % slope:	4.9
	comments:		
03900882	sampled: 10/03/90	LC50:	>100 %
	95% fid. limits: 0.0 -	0.0 %	
	comments: LC50 >100		
03900971	sampled: 11/07/90	LC50:	>100 %
	95% fid. limits: 0.0 -	0.0 %	
	comments: LC50 >100		
03901057	sampled: 12/05/90	LC50:	>100 %
	95% fid. limits: 0.0 -	0.0 %	
	comments: LC50 >100		
03910000	sampled: 01/02/91	LC50:	>100 %
	95% fid. limits: 0.0 -	0.0 %	
	comments: LC50 >100		

Ford Motor Company of Canada Ltd. (continued)

02910004 sampled: 01/09/91 LC50: 60.0 - 100.0 %  
95% fid. limits: 0.0 - 0.0 %  
comments: MISA Audit

03910097 sampled: 02/06/91 LC50: 83.9 %  
95% fid. limits: 61.5 - 114.4 % slope: 4.0  
comments:

03910153 sampled: 03/06/91 LC50: 55.6 %  
95% fid. limits: 42.4 - 78.8 % slope: 4.5  
comments:

03910206 sampled: 04/03/91 LC50: 83.9 %  
95% fid. limits: 61.5 - 114.4 % slope: 4.0  
comments:

Intake Water

Foundry Process Effluent

Rain Gauge

Foundry Combined Overflow

COMPANY: Franklin Electric of Canada Ltd., Strathroy  
(8240004)  
SECTOR: Metal Casting  
REGION: Southwest

#### SUMMARY

Three samples were collected from the Cooling Pond Overflow and tested for acute toxicity to rainbow trout using the 96 hr LC50 test. One was non-lethal. Two had LC50s of >100 % effluent.

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#### Cooling Pond Overflow

03910113 sampled: 02/13/91 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments: Effluent Hardness = 340 mg/L; MOE Audit

01910095 sampled: 05/14/91 LC50: >100 %  
95% fid. limits: 0.0 - 0.0 %  
comments: MISA Audit

03910314 sampled: 05/21/91 LC50: >100 %  
95% fid. limits: 0.0 - 0.0 %  
comments: MOE Audit; Effluent Hardness = 230 mg/l

#### Intake Water

#### Rain Gauge

COMPANY: Franklin Electric of Canada Ltd., Strathroy  
(8240004)  
SECTOR: Metal Casting  
REGION: Southwest

#### SUMMARY

Three samples were collected from the Cooling Pond Overflow and tested for acute toxicity to *Daphnia magna* using the 48 hr LC50 test. One was non-lethal. Two had LC50s of >100 % effluent.

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#### Cooling Pond Overflow

03910113 sampled: 02/13/91 LC50: >100 %  
95% fid. limits: 0.0 - 0.0 %  
comments: Effluent Hardness = 340 mg/L; MOE Audit

02910095 sampled: 05/14/91 LC50: >100 %  
95% fid. limits: 0.0 - 0.0 %  
comments: MISA Audit

03910314 sampled: 05/21/91 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments: Effluent Hardness = 230 mg/L; MOE Audit

#### Intake Water

#### Rain Gauge

COMPANY: General Motors of Canada Ltd., St. Catharines  
(1630003)  
SECTOR: Metal Casting  
REGION: West Central

#### SUMMARY

Thirteen samples were collected from the Foundry Combined and tested for acute toxicity to rainbow trout using the 96 hr LC50 test. Six were non-lethal. Six had LC50s of >100 % effluent, and one had an LC50 value of 81.1% effluent.

---

Intake Welland Sh.

Foundry Process

Foundry Combined

06900620 sampled: 05/21/90 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments: NO MORTALITY OR SUBLETHAL IMPAIRMENT OBSERVED

06900817 sampled: 06/25/90 LC50: >100 %  
95% fid. limits: 0.0 - 0.0 %  
comments: 10% MORTALITY IN THE 100% CONCENTRATION

06900892 sampled: 07/10/90 LC50: >100 %  
95% fid. limits: 0.0 - 0.0 %  
comments: 20% MORTALITY IN 100% TEST CONCENTRATION

06901165 sampled: 08/13/90 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments: NO MORTALITY OR SUBLETHAL IMPAIRMENT OBSERVED

06901424 sampled: 09/12/90 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments: NO MORTALITY OR SUBLETHAL IMPAIRMENT OBSERVED

06901683 sampled: 10/16/90 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments: NO MORTALITY OR SUBLETHAL IMPAIRMENT OBSERVED

06901880 sampled: 11/13/90 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments: NO MORTALITY OR SUBLETHAL IMPAIRMENT OBSERVED

06902110 sampled: 12/11/90 LC50: >100 %  
95% fid. limits: 0.0 - 0.0 %  
comments: 20% MORTALITY IN 100% TEST CONCENTRATION.

General Motors of Canada Ltd. (continued)

06910064 sampled: 01/15/91 LC50: >100 %  
95% fid. limits: 0.0 - 0.0 %  
comments: 30% MORTALITY IN FULL STRENGTH EFFLUENT

03910055 sampled: 01/21/91 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments: Effluent Hardness = 140 mg/L; MOE Audit

06910233 sampled: 02/12/91 LC50: 81.1 %  
95% fid. limits: 59.0 - 180.9 % slope: 2.9  
comments: 60% MORTALITY IN 100% CONCENTRATION.

06910492 sampled: 03/12/91 LC50: >100 %  
95% fid. limits: 0.0 - 0.0 %  
comments: 40% MORTALITY IN 100%.

06910689 sampled: 04/09/91 LC50: >100 %  
95% fid. limits: 0.0 - 0.0 %  
comments: 10% MORTALITY IN 100%

Rain Gauge



COMPANY: General Motors of Canada Ltd., St. Catharines  
(1630003)  
SECTOR: Metal Casting  
REGION: West Central

#### SUMMARY

Thirteen samples were collected from the Foundry Combined and tested for acute toxicity to *Daphnia magna* using the 48 hr LC50 test. Seven were non-lethal. Three had LC50s of >100 % effluent. LC50 values were 80.6, 86.8, 94.7% effluent.

---

Intake Welland Sh.

Foundry Process

Foundry Combined

06900621 sampled: 05/21/90 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments: NO MORTALITY OBSERVED DURING TESTING

06900818 sampled: 06/25/90 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments: NO MORTALITY OR IMMOBILITY OBSERVED IN 48 HRS

06900893 sampled: 07/10/90 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments: NO MORTALITY OR IMMOBILITY OBSERVED IN 48 HRS

06901166 sampled: 08/13/90 LC50: >100 %  
95% fid. limits: 0.0 - 0.0 %  
comments: 10% MORTALITY IN 100% TEST CONCENTRATION.

06901425 sampled: 09/12/90 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments: NO MORTALITY OR IMMOBILITY OBSERVED IN 48 HRS

06901684 sampled: 10/16/90 LC50: >100 %  
95% fid. limits: 0.0 - 0.0 %  
comments: 10% MORTALITY IN 65% TEST CONCENTRATION.

06901881 sampled: 11/13/90 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments: NO MORTALITY OR IMMOBILITY OBSERVED IN 48 HRS

06902111 sampled: 12/11/90 LC50: 80.6 %  
95% fid. limits: 68.9 - 107.4 %  
comments: 70% MORTALITY IN FULL STRENGTH EFFLUENT.

General Motors of Canada Ltd. (continued)

06910065 sampled: 01/15/91 LC50: 86.8 %  
95% fid. limits: 72.3 - 128.3 % slope: 6.9  
comments: 70% MORTALITY IN 100% CONCENTRATION.

03910055 sampled: 01/21/91 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments: Effluent Hardness = 140 mg/L; MOE Audit

06910234 sampled: 02/12/91 LC50: >100 %  
95% fid. limits: 0.0 - 0.0 %  
comments: 10% MORTALITY IN 100% CONCENTRATION.

06910493 sampled: 03/12/91 LC50: 94.7 %  
95% fid. limits: 65.0 - 99.9 %  
comments: 60% MORTALITY IN 100%.

06910690 sampled: 04/09/91 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments: NO MORTALITY OR IMMOBILITY OBSERVED IN 48 HRS

Rain Gauge

COMPANY: Haley Industries Ltd., Haley  
(58840000)  
SECTOR: Metal Casting  
REGION: Southeast

#### SUMMARY

Thirteen samples were collected from the East Process Sewer and tested for acute toxicity to rainbow trout using the 96 hr LC50 test. One was non-lethal. One had an LC50 of >100%.

For the remaining samples, LC50 values ranged from 2.0 to 100% effluent for the rest.

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#### Combined Effluent

#### East Process Sewer

16900006 sampled: 05/16/90 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments: NO LC50 DUE TO >50% SURVIVAL AT 100% CONC.

16900009 sampled: 06/13/90 LC50: >100 %  
95% fid. limits: 0.0 - 0.0 %  
comments:

16900016 sampled: 07/19/90 LC50: 89.4 %  
95% fid. limits: 89.4 - 89.4 %  
comments:

16900018 sampled: 08/15/90 LC50: 100.0 - 80.0 %  
95% fid. limits: 0.0 - 0.0 %  
comments: UNABLE TO CALCULATE LC50 - 50% MORT @100%,80%

16900025 sampled: 09/13/90 LC50: 14.1 %  
95% fid. limits: 14.1 - 14.1 %  
comments:

16900030 sampled: 10/17/90 LC50: 2.0 %  
95% fid. limits: 1.6 - 2.4 %  
comments: ALPHA-10

16900039 sampled: 11/14/90 LC50: 83.7 %  
95% fid. limits: 83.6 - 83.6 %  
comments:

16900044 sampled: 12/12/90 LC50: 63.6 %  
95% fid. limits: 56.0 - 73.0 %  
comments: ALPHA-10

01910015 sampled: 01/14/91 LC50: 74.7 %  
95% fid. limits: 65.0 - 85.9 %  
comments: MISA Audit

Haley Industries Ltd. (continued)

16910046 sampled: 01/16/91 LC50: 59.2 %  
95% fid. limits: 59.1 - 59.1 %  
comments: ALPHA IS ZERO

16910058 sampled: 02/13/91 LC50: 19.3 %  
95% fid. limits: 13.0 - 28.7 %  
comments: ALPHA IS ZERO

16910061 sampled: 03/13/91 LC50: 26.9 %  
95% fid. limits: 21.9 - 33.0 %  
comments: ALPHA-0

16910073 sampled: 04/17/91 LC50: 14.2 %  
95% fid. limits: 8.4 - 19.2 %  
comments: PROBIT ANALYSIS

West Process Sewer

Intake Water

Rain Gauge

WWTP

COMPANY: Haley Industries Ltd., Haley  
(58840000)  
SECTOR: Metal Casting  
REGION: Southeast

#### SUMMARY

Thirteen samples were collected from the East Process Sewer and tested for acute toxicity to *Daphnia magna* using the 48 hr LC50 test. A toxicity test on a sample collected July 19, 1990 was invalid due to control mortalities. Six were non-lethal. One sample had an LC50 of >100% effluent. LC50 values were 20.7, 4.0, 69.1, 26.9, 11.4% effluent.

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#### Combined Effluent

#### East Process Sewer

16900006 sampled: 05/16/90 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments: NO LC50 DUE TO >50% SURVIVAL AT 100% CONC.

16900008 sampled: 06/13/90 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments: NO LC50 DUE TO >50% SURVIVAL AT 100% CONC.

16900014 sampled: 08/15/90 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments: NO LC50 DUE TO >50% SURVIVAL AT 100% CONC.

16900020 sampled: 09/13/90 LC50: 20.7 %  
95% fid. limits: 26.2 - 16.5 %  
comments:

16900022 sampled: 10/17/90 LC50: 4.0 %  
95% fid. limits: 2.8 - 5.5 %  
comments: ALPHA-0

16900030 sampled: 11/14/90 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments: LC-50 >100%

16900034 sampled: 12/12/90 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments: LC-50 > 100%

02910015 sampled: 01/14/91 LC50: 69.1 %  
95% fid. limits: 50.0 - 116.6 % slope: 3.1  
comments: MISA Audit; High Conductivity

Haley Industries Ltd. (continued)

16910036 sampled: 01/16/91 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments: LC50>100%

16910047 sampled: 02/13/91 LC50: >100 %  
95% fid. limits: 0.0 - 0.0 %  
comments: LC50>100%

16910050 sampled: 03/13/91 LC50: >100 %  
95% fid. limits: 0.0 - 100.0 %  
comments: LC 50>100%

16910063 sampled: 04/17/91 LC50: 11.4 %  
95% fid. limits: 5.9 - 15.7 %  
comments: PROBIT ANALYSIS

West Process Sewer

Intake Water

Rain Gauge

WWTP

COMPANY: Kubota Metal Corp., Fahramet Div., Orillia  
(47860002)  
SECTOR: Metal Casting  
REGION: Central

#### SUMMARY

Five samples were collected from the Cooling Pond Overflow and tested for acute toxicity to rainbow trout using the 96 hr LC50 test. Four were non-lethal. One sample had an LC50 of >100% effluent.

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#### Cooling Pond Overflow

09900009	sampled: 05/02/90	non-lethal
95% fid. limits:	0.0 -	0.0 %
comments:		
09900010	sampled: 08/16/90	non-lethal
95% fid. limits:	0.0 -	0.0 %
comments:		
09900020	sampled: 12/06/90	non-lethal
95% fid. limits:	0.0 -	0.0 %
comments:		
01910012	sampled: 01/16/91	non-lethal
95% fid. limits:	0.0 -	0.0 %
comments:	MISA Audit	
09910023	sampled: 03/07/91	LC50: >100 %
95% fid. limits:	0.0 -	0.0 %
comments:		

#### Rain Gauge

COMPANY: Kubota Metal Corp., Fahramet Div., Orillia  
(47860002)  
SECTOR: Metal Casting  
REGION: Central

#### SUMMARY

Five samples were collected from the Cooling Pond Overflow and tested for acute toxicity to Daphnia magna using the 48 hr LC50 test. Four were non-lethal. One sample had an LC50 of >100% effluent.

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#### Cooling Pond Overflow

09900009 sampled: 05/02/90 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments:

09902010 sampled: 08/16/90 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments:

09902020 sampled: 12/06/90 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments:

02910012 sampled: 01/16/91 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments: MISA Audit

09912023 sampled: 03/07/91 LC50: >100 %  
95% fid. limits: 0.0 - 0.0 %  
comments: Film on surface of 30,60 & 100%.

#### Rain Gauge



COMPANY: Richmond Die Casting Company Ltd., Cornwall  
(94000007)  
SECTOR: Metal Casting  
REGION: Southeast

#### SUMMARY

Three samples were collected from the 12 Inch Outlet Sewer and tested for acute toxicity to rainbow trout using the 96 hr LC50 test. Three were non-lethal.

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#### 12 Inch Outlet Sewer

11900031 sampled: 06/12/90 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments: Tap water through charcoal and UV

01900263 sampled: 11/13/90 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments: MISA Audit

11900059 sampled: 12/11/90 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments: water through charcoal and UV

COMPANY: Richmond Die Casting Company Ltd., Cornwall  
(94000007)  
SECTOR: Metal Casting  
REGION: Southeast

SUMMARY

Three samples were collected from the 12 Inch Outlet Sewer and tested for acute toxicity to Daphnia magna using the 48 hr LC50 test. Three were non-lethal.

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12 Inch Outlet Sewer

11900031 sampled: 06/12/90 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments: Water from tap through charcoal and UV

02900263 sampled: 11/13/90 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments: MISA Audit; Non-lethal

11900059 sampled: 12/11/90 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments:

COMPANY: Western Foundry Co. Ltd., Wingham  
(18660001)  
SECTOR: Metal Casting  
REGION: Southwest

#### SUMMARY

Two samples were collected from the Core Machine/Compressor cooling water and tested for acute toxicity to rainbow trout using the 96 hr LC50 test. Two were non-lethal. Three samples were collected from the Furnace Cooling Water and tested for acute toxicity to rainbow trout using the 96 hr LC50 test. Two were non-lethal. One sample had an LC50 of >100% effluent.

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#### Core Machine/Compressor

03900516 sampled: 06/19/90 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments: non lethal

03910012 sampled: 01/08/91 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments: Non lethal

#### Furnace Cooling Water

03900515 sampled: 06/19/90 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments: non lethal

03910011 sampled: 01/08/91 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments: Non lethal

03910101 sampled: 02/06/91 LC50: >100 %  
95% fid. limits: 0.0 - 0.0 %  
comments: Effluent Hardness = 60 mg/L; MOE Audit

COMPANY: Western Foundary, Wingham  
(18660001)  
SECTOR: Metal Casting  
REGION:

#### SUMMARY

Two samples were collected from the Core Machine/Compressor cooling water and tested for acute toxicity to Daphnia magna using the 48 hr LC50 test. One was non-lethal the other had an LC50 of >100% effluent. Three samples were collected from the Furnace Cooling Water and tested for acute toxicity to Daphnia magna. Two were non-lethal. The other sample had an LC50 of >100% effluent.

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#### Core Machine/Compressor

03900516 sampled: 06/19/90 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments: Non-lethal

03910012 sampled: 01/08/91 LC50: >100 %  
95% fid. limits: 0.0 - 0.0 %  
comments: LC50 100

#### Furnace Cooling Water

03900515 sampled: 06/19/90 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments: Non-lethal

03910011 sampled: 01/08/91 LC50: >100 %  
95% fid. limits: 0.0 - 0.0 %  
comments: LC50 >100

03910101 sampled: 02/06/91 non-lethal  
95% fid. limits: 0.0 - 0.0 %  
comments: Effluent Hardness = 270 mg/L; MOE Audit



